Sustainable Water Management Initiative
Technical Subcommittee

Presentation Title: Streamflow Criteria

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Streamflow Criteria

Purpose

- Use August alteration to describe seasonal use patterns
- Develop maximum seasonal use that is protective
  - Using Biology (Categories) as a background
- Illustrate available water allocation strategies (seasonality)

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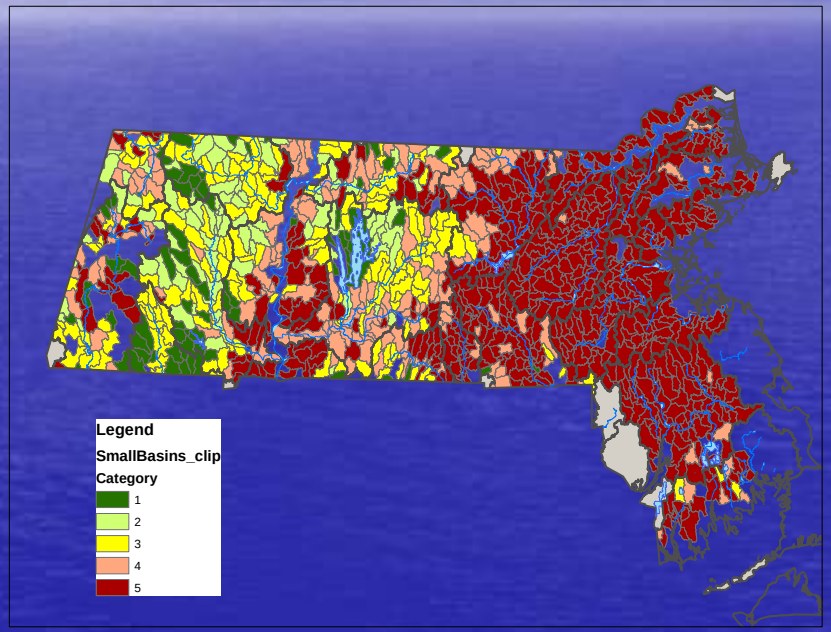
Categorization

- Natural Watershed Characteristics
- Impervious Cover
- Flow Alteration – using August as the indicator



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Flow Alteration Levels: Depleted Sites

- From the USGS Fish and Flow model: Relationship between flow alteration and the range of fluvial fish relative abundance:

↑ 1% Aug Alt → ↓ 1 % FFRA Range

Level	August % Alt	# of BASINS
1	< 5%	496
2	5 – 15%	99
3	15 – 35%	78
4	35 – 65%	45
5	> 65%	67

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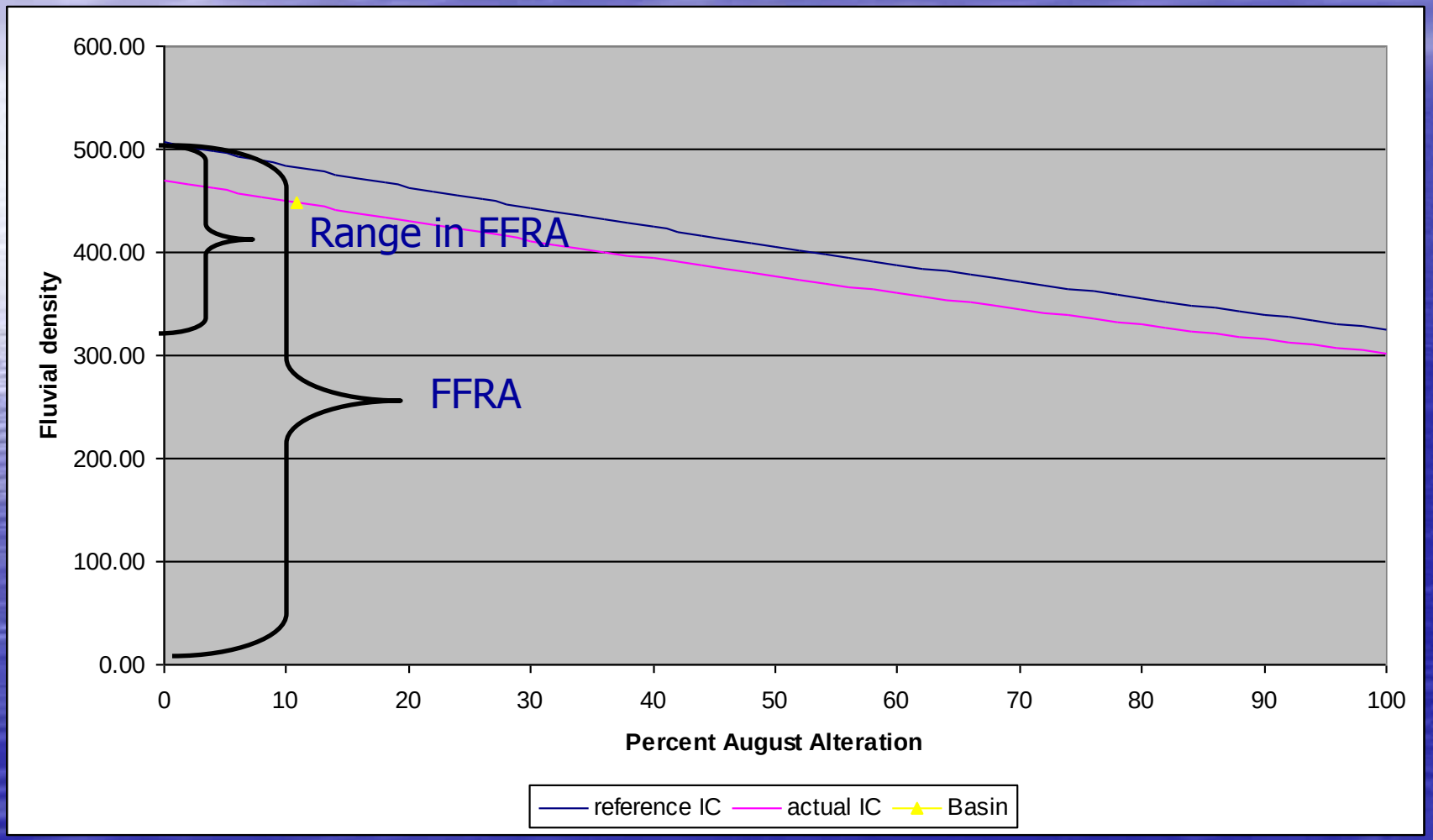
Basin 19056



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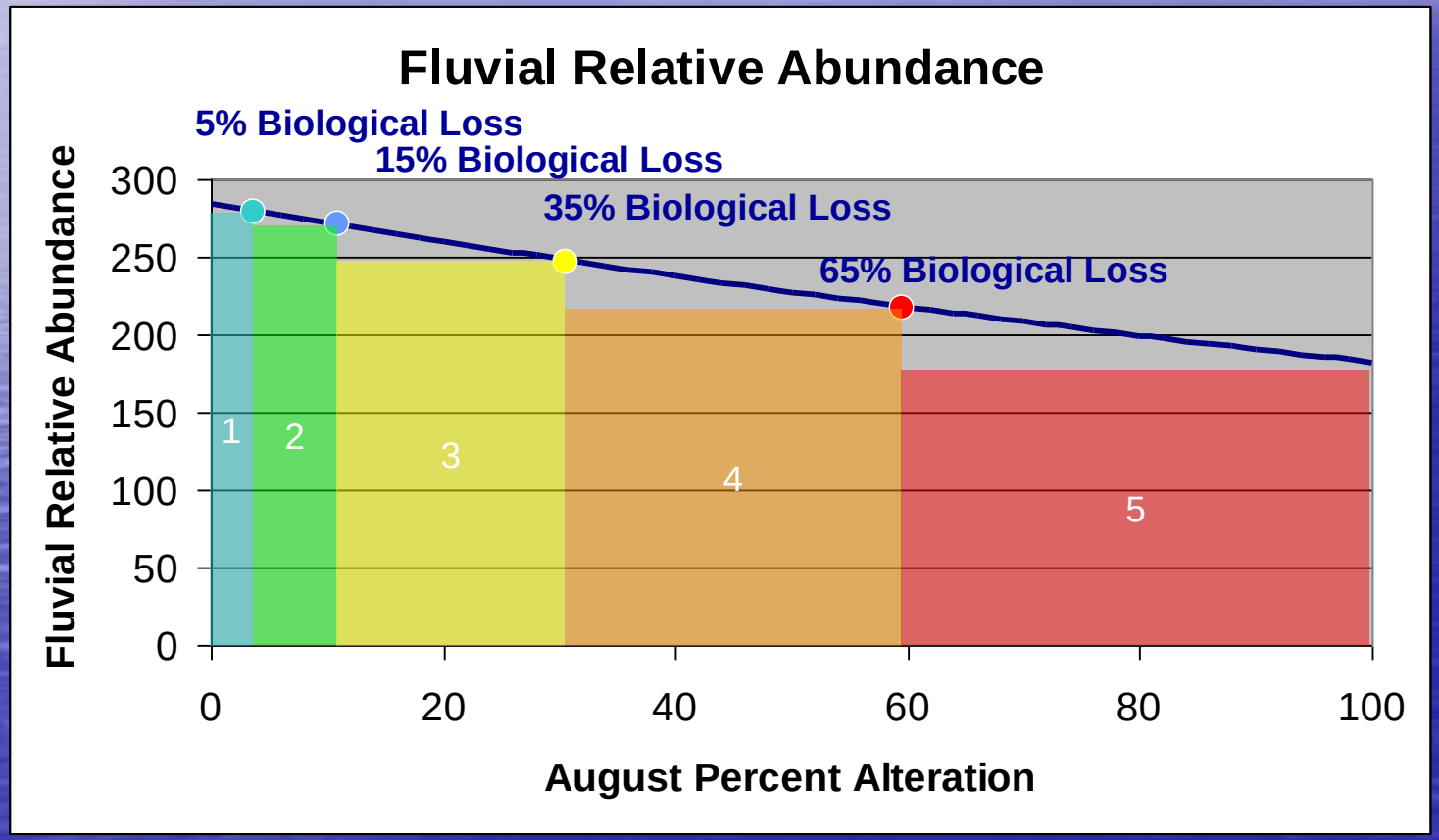
Range of Fluvial Fish Relative Abundance



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Moving Past August:

Developing Seasonal Flow Alteration Criteria

- August was the month examined in the model
- Develop a simple method that relates August to other MWI statistics
- Today we will illustrate:
  - October
  - January
  - April

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Moving Past August – Reduced Flow Basins

- Max August alteration is related to max October Alteration

Flow Alteration Level	Max Oct PA
1 (496 basins with <5% August Alt)	4.1

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October Alteration

Max August Alt	Max October Alt
1 (<5% August Alt)	4.1
2 (<15% August Alt)	7.8
3 (<35% August Alt)	20.3
4 (<65% August Alt)	37.0
5(>65% August Alt)	

Repeat for seasons and statistics of interest (MWI)

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Flow Criteria: Reduced Flow Basins

Alteration Level	August	October	January	April
1	<5%	4.1%	1.7%	1.7%
2	<15%	7.8%	2.8%	1.7%
3	<35%	20.3%	6.8%	3.0%
4	<65%	37.1%	10.1%	6.6%
5				

1 basin exceeding seasonal criteria

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Volume (mgd)

Alteration Level	August	October	January	April
1	0.10	0.11	0.13	0.27
2	0.27	0.21	0.22	0.27
3	0.64	0.54	0.54	0.47
4	1.19	0.98	0.80	1.03
5				

1 basin exceeding seasonal criteria

Scenario 1: Seasonality Under Existing Condition

- Example Basin 19056 (Westfield Watershed):
  - Biological Category 3(15 to 35% Alteration of the Range of FFRA (32%))
  - August Alteration Level 2 (5 to 15% Alteration (10.5%))

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Determining Existing Flow Alteration

- Use SYE to determine alteration
  - Unaltered
  - Compare to existing alteration

Seasons	Current Alteration %	Level 2 Criteria %
October	5.8	7.8
January	1.8	2.8
April	1.2	1.6
August	10.5	15

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Scenario 2: Seasonality Under Increased Use

- Example Basin 19056:
- How much water can be removed without changing:
  - Biological Category (3)
  - Flow Alteration Level (2)
- Run the Model

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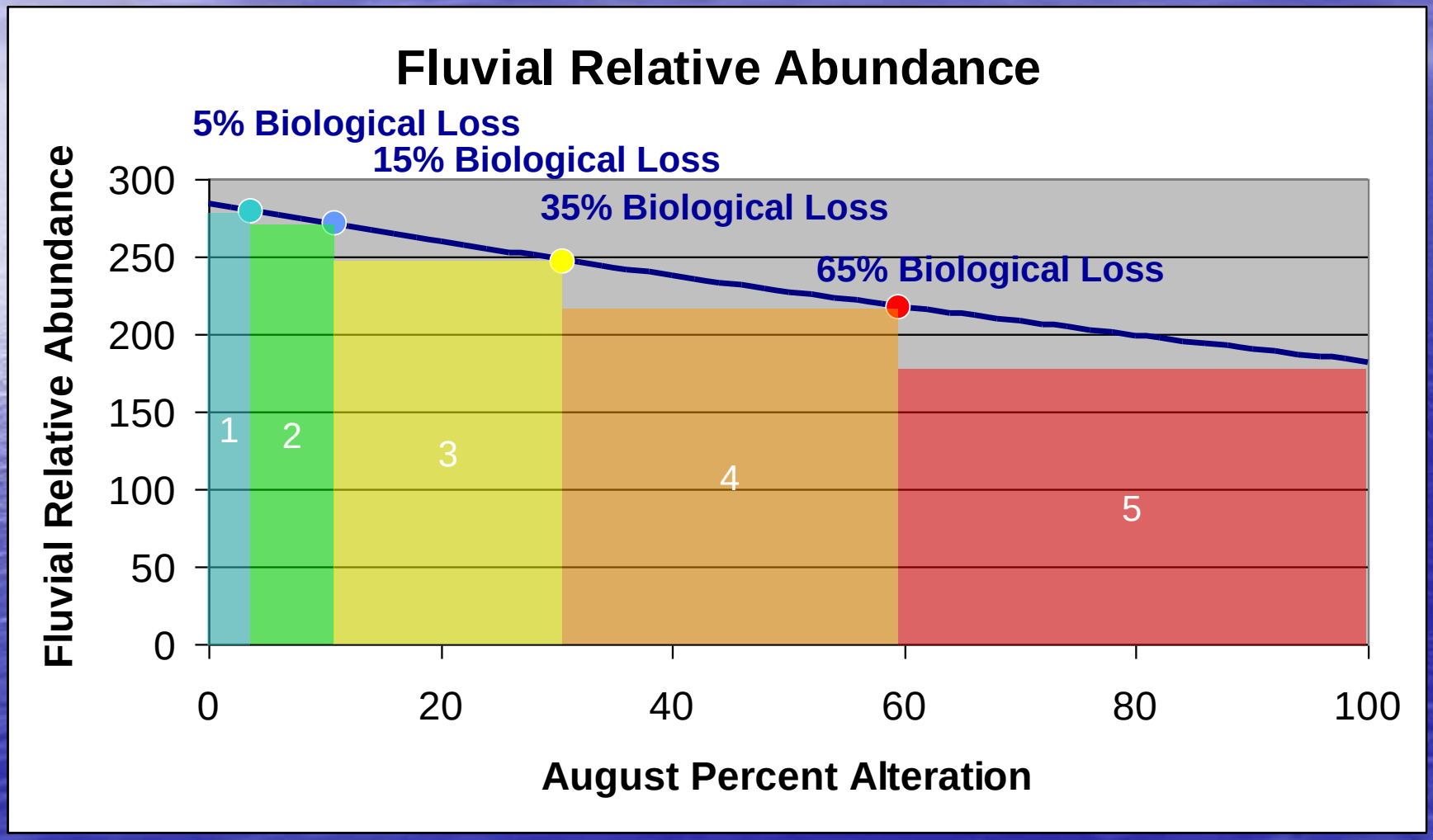

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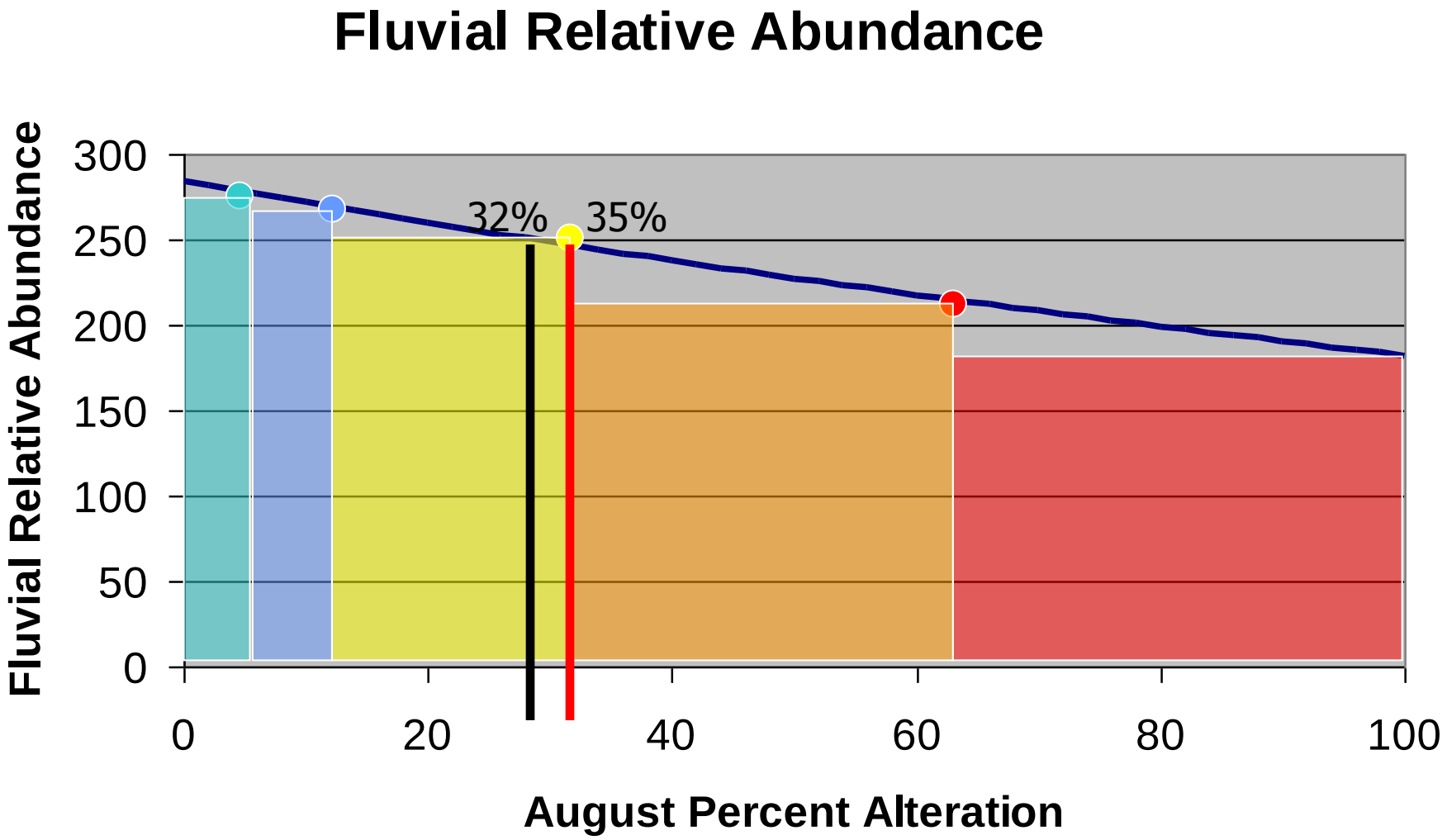
Basin 19056: Current Condition = 32% Alteration to FFRA Range



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3% Increase in August % Alt

- Use SYE to determine alteration
  - Unaltered
  - Compare to 3% increase in alteration

Seasons	Proposed Alteration	Level 2 Criteria
October	7.9	7.8
January	2.5	2.8
April	1.4	1.6
August	13.5	15

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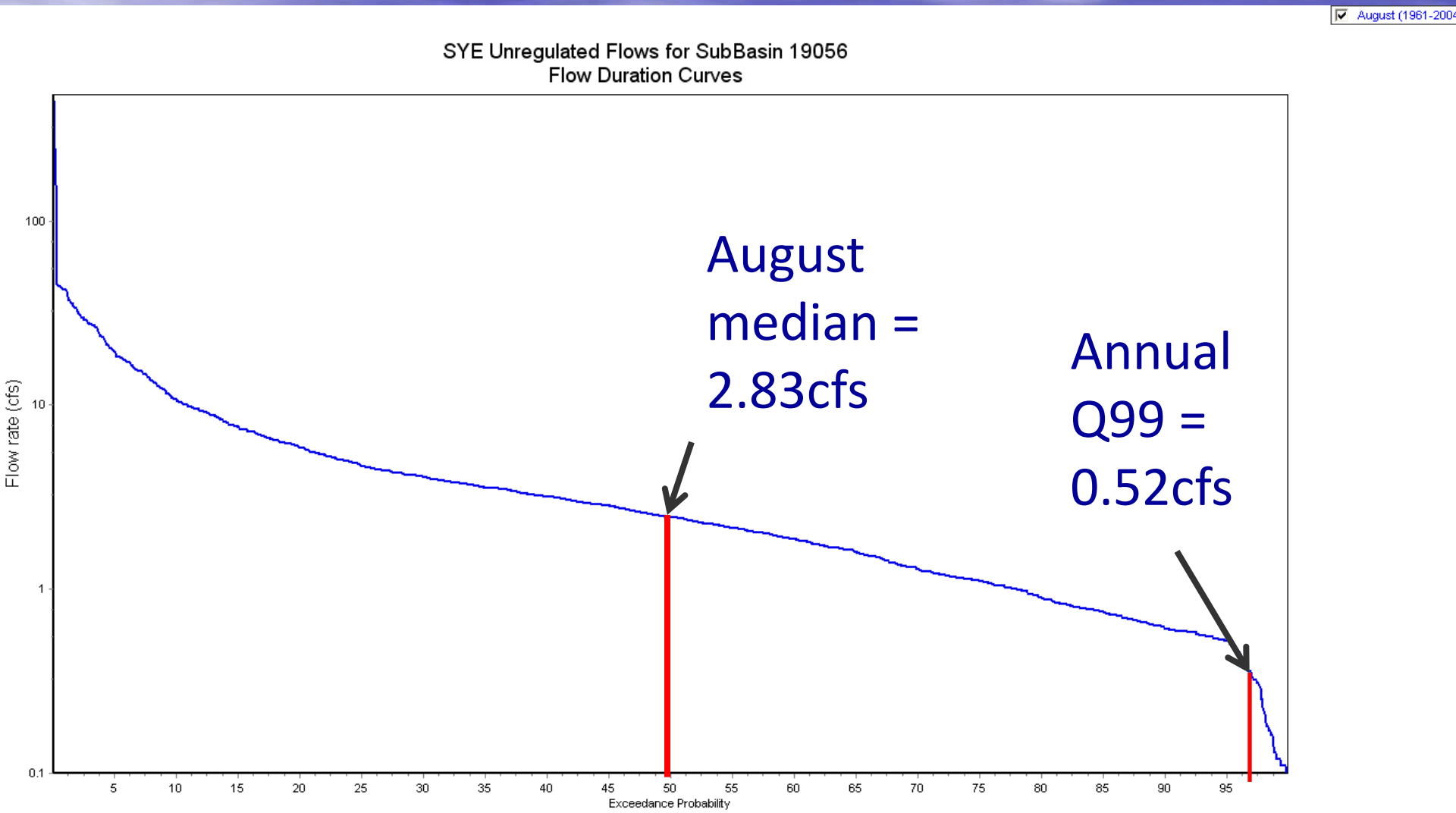
August Flow Duration Curve (1961-2004) for Westfield Sub Basin 19056:

Comparison between August median and Annual Q99



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August Median vs Q99

- Q99 = 0.52 cfs
- CT Class 1 = .05X Q99 = 0.026 cfs

- August Median = 2.83 cfs
- MA Flow Alteration Level = .05X August Median = 0.14 cfs

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Summary

- Seasonal stream flow criteria provide
  - Protection for fish and wildlife resources
  - A roadmap for sustainable water use
- Analytical tools in hand (we ran a sample!)
- Need additional tools for surface water
- Need to run example for surcharged basins
- Next Steps
  - Goal Class Discussion

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